

Nov. 27, 1923.

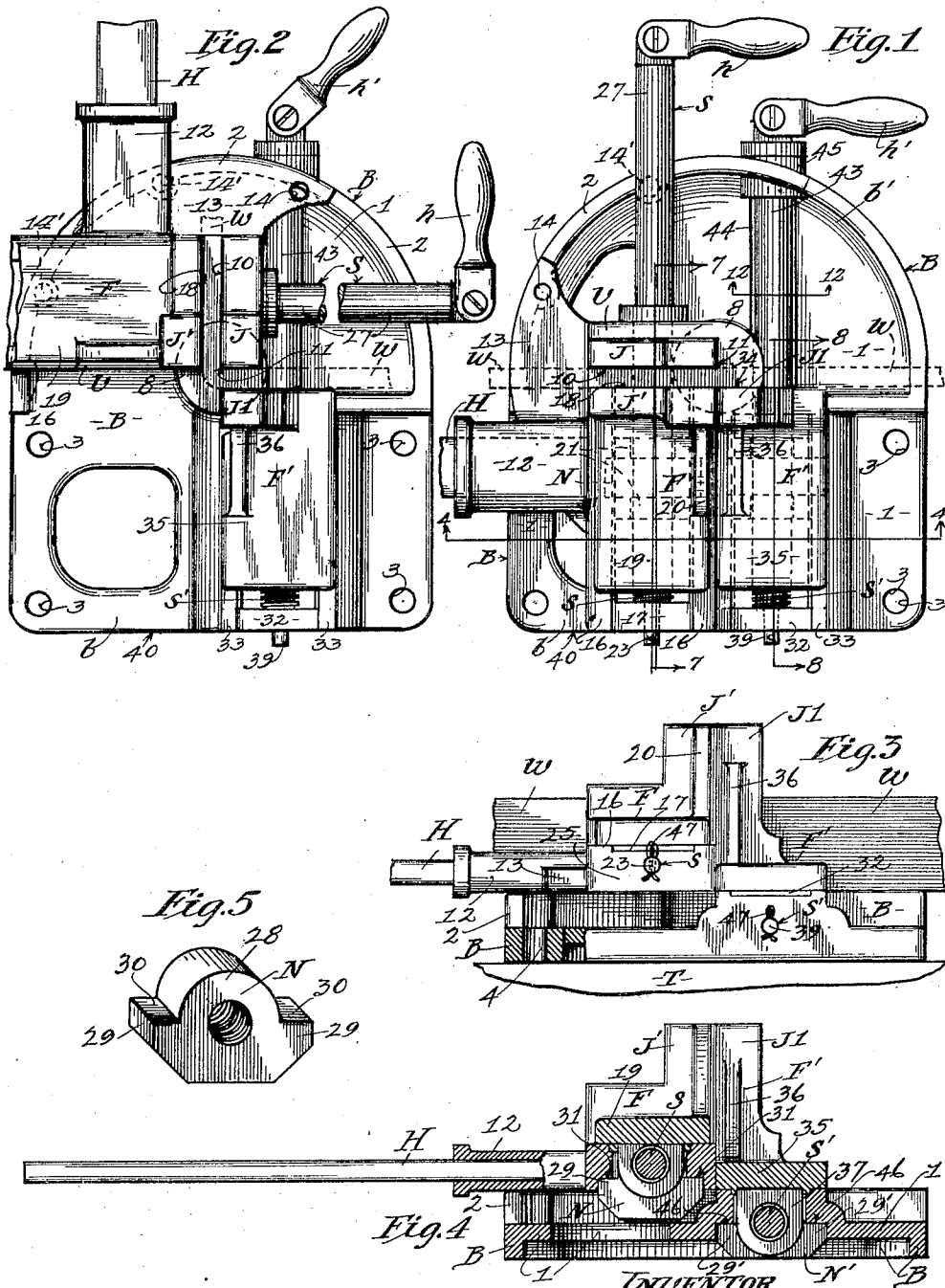
C. S. GORDON

1,475,813

COMBINED BENDING MACHINE AND VISE

Filed Jan. 17, 1922

2 Sheets-Sheet 1



INVENTOR.

Clarence S. Gordon

By L. W. L. Maer  
Attorney

Nov. 27, 1923.

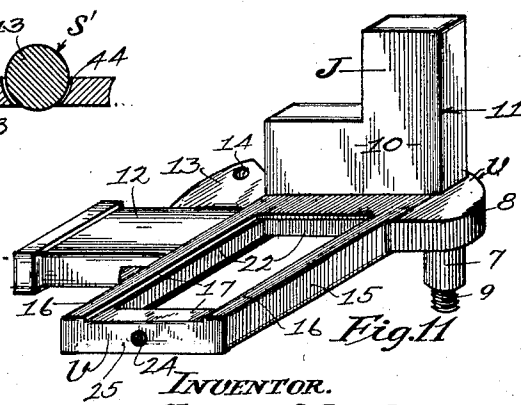
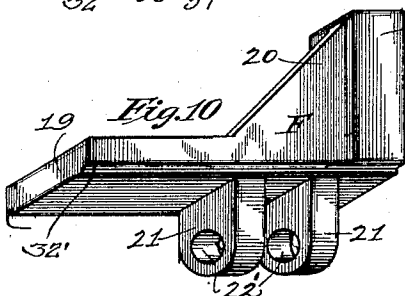
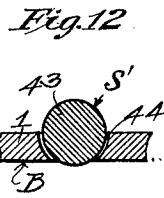
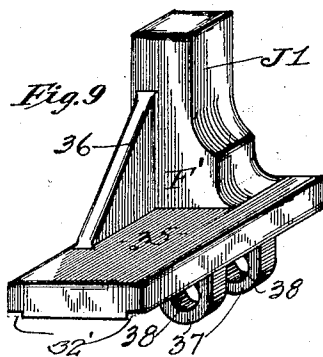
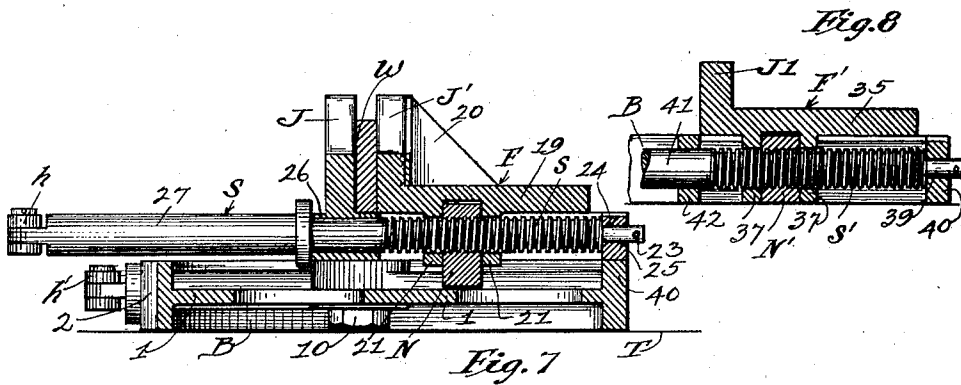
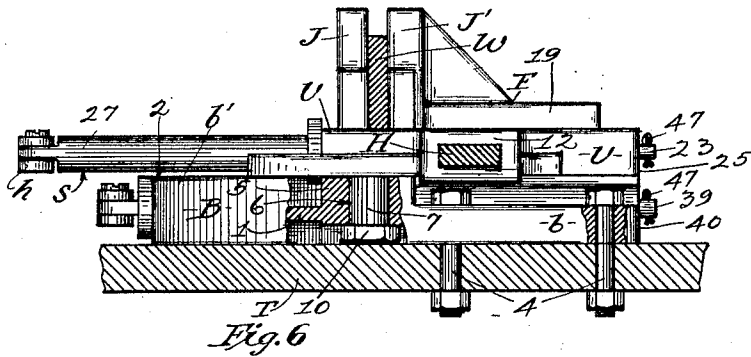
1,475,813

C. S. GORDON

COMBINED BENDING MACHINE AND VISE

Filed Jan. 17, 1922

2 Sheets-Sheet 2



INVENTOR.  
Clarence S. Gordon,  
By *Stark A. Maed*  
Attorney.

Patented Nov. 27, 1923.

1,475,813

# UNITED STATES PATENT OFFICE.

CLARENCE S. GORDON, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO ROBERT R. McDANIELS, OF LOS ANGELES, CALIFORNIA.

## COMBINED BENDING MACHINE AND VISE.

Application filed January 17, 1922. Serial No. 529,979.

*To all whom it may concern:*

Be it known that I, CLARENCE S. GORDON, a citizen of the United States, and a resident of Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Combined Bending Machines and Vises, of which the following is a specification.

This invention relates to bending machines, and more particularly to a form of bending machine and vise combined, wherein strips or pieces of metal of different sizes and shapes may be tightly held and bent to a required angle in a simple operation and in an effective manner.

The primary object of my invention is to provide a bending machine of simple design and with a minimum number of parts, so held together that they may be readily assembled and disassembled and arranged to be supported on a work bench or table, as in the case of ordinary bench vises.

An object of my invention is to provide in a machine of the character mentioned, a base adapted to be stationarily supported on a bench or table, and a plurality of relatively adjustable forming blocks mounted on said base and provided with jaws for gripping strips or pieces of metal, and adapted for clamping the strips or pieces of metal rigidly in position, one of said forming blocks being pivotally held on said base and adapted to be swung thereon for bending the metal against the jaw of the other forming block.

Another object is to provide in combination with a stationary base having a slidably adjustable forming block mounted thereon, another forming block pivotally and slidably mounted on said base, so that the jaws thereof may be disposed at any desired angle with respect to the jaw of said other forming block, for the purpose of holding strips or pieces of metal at any desired angle on the base, and capable of use as a vise when the movable forming block is stationary held.

Still another object is to provide a stationary base having a screw operated forming block slidably held thereon, and a swivel forming block pivotally held thereon, and including relatively stationary and movable jaws forming a vise for gripping the strips or pieces of metal in a bending operation, or for the purposes of an ordinary vise.

Other minor and detailed objects of invention will appear as the description progresses.

Referring now to the annexed drawings, in which I have shown a preferred embodiment of my invention, subject to modification within the scope of the appended claims:

Figure 1 is a plan view of my improved bending machine and vise, with the jaws aligned transversely for the reception of a strip or piece of metal therebetween, preparatory to a bending operation.

Fig. 2 is a similar view of my machine with the forming blocks disposed at right angles to each other at the completion of the bending operation, in which a strip or piece of metal has been bent to an angle of 90 degrees.

Fig. 3 is an end view of the machine.

Fig. 4 is a transverse sectional elevation of the same, on line 4—4 of Fig. 1.

Fig. 5 is a perspective view of one of the nuts for effecting the movement of the forming blocks on the base.

Fig. 6 is a side elevation of the machine, partly in section.

Fig. 7 is a longitudinal sectional elevation of the same, on line 7—7 of Fig. 1.

Fig. 8 is a fragmentary sectional elevation on line 8—8 of Fig. 1.

Fig. 9 is a perspective view of the base forming block.

Fig. 10 is a perspective view of the swivel forming block.

Fig. 11 is a perspective view of the vise body; and Fig. 12 is a fragmentary section of the base on line 12—12 of Fig. 1.

As shown in the drawings, B represents a base which has a horizontal web 1, one portion of which is rectangular, as at *b*, and the remaining portion semi-circular, as at *b'*. The portion *b'* has a semi-circular rib 2 extending above the surface of the web 1, and the upper edge of said rib is adapted to be machined smooth for purposes hereinafter described.

The rectangular portion *b* of the base has a plurality of bores 3, 3, etc., formed therein and adapted to receive bolts 4, 4, for the purpose of holding the base stationarily on a table or bench T. In the approximate center of the base B, I provide a boss 5 which is concentric with the rib 2 of the portion *b'* and is bored at 6 to receive a stud 7,

either integral with or fixed to a corresponding boss 8 in the vise frame V, which is supported on the upper surface of the base B and is adapted to swing about the axis of the stud 7 and over the upper smooth surface of the rib 2.

The stud 7 may have a reduced threaded portion 9 on the lower end thereof, so that a nut 10 may be threaded thereon below the boss 5 of the base, for holding the vise frame in position on the base. The vise V has an integral jaw J on the inner end thereof and extending transversely across the vise, so that when the vise is positioned as shown in Fig. 1, the inner surface 10 of the jaw J will be disposed transversely of the base B. The jaw J of the vise is preferably in two portions, one of which is higher than the other, and the inner corner 11 of the higher portion of said jaw is alined with the axis of the swivel stud 7 of the vise.

The vise V has an extension 12 of rectangular cross section which is disposed at right angles to the body of the vise and is recessed to receive a bar H which constitutes a handle whereby the vise may be swung on its axis over the rib 2 of the vise, and said vise also has an arcuate web 13 which connects the extension 12 and the vise body, and has its outer edge formed substantially flush with the outer edge of the rib 2 of the base and adapted to be moved over said rib, as shown in Figs. 1 and 2.

The extension 13 is provided with a hole 14 and the base B is provided with a pair or more of holes 14' with which the hole 14 of extension 13 is adapted to register, when the vise is positioned as shown in Fig. 1, or when extended to an acute angle relative to the base. The vise may thereafter be stationarily held on the base by inserting a bolt pin through the hole 14 and one of the holes 14' when the vise is to be used for ordinary purposes of such devices.

The vise body is provided with a longitudinal extension 15 of rectangular form and the upper portion thereof has guides 16, 16 formed thereon with a guideway 17 therebetween, which is adapted to receive a forming block F of slightly narrower width than the extension 15 of the vise. Said forming block has a jaw J' formed on the inner end thereof and corresponding to the jaw J of the vise body. The inner surface 18 of said jaw being parallel at all times with the surface 10 of the jaw J, so that the strip or piece of metal, as at W, may be held transversely in the vise between the jaws J and J' and clamped thereon by means hereinafter described.

The jaw J' is braced against the base 19 of the forming block F by means of a rib 20 and a pair of spaced lugs 21, 21 are integrally formed on the block F and near the forward end thereof, and depend down-

wardly through a central opening 22 in the vise frame V.

The lugs 21, 21, are bored at 22' to receive a screw S which has a reduced portion 23 journaled in a hole 24 in the outer end 25 of the vise frame, and is additionally journaled in a bearing 26 beneath the jaw J of said vise. Said screw has an extension 27 extending rearwardly over and substantially beyond the rib 2 of base B, and the rear end of said extension has a handle h pivotally held thereon and capable of extension to right angles with respect to the screw, so as to effect the turning of the screw in its bearings.

A nut N is threaded onto the screw S between the lugs 21, 21 of the block F and has a central portion 28, which extends upwardly into a recess in the base 19 of said block and lateral extensions 29, 29 with diametrically alined surfaces 30, 30 thereon adapted to slidably engage guideways 31, 31, formed on the lower side of the vise frame V, as shown in Fig. 4.

Thus, it will be apparent that the turning of the screw S by means of the handle h will effect the corresponding movement of the nut N longitudinally of the vise frame, and the nut N being held between the lugs 21, 21, of the forming block F will correspondingly slide said block longitudinally on the vise frame V, so as to regulate the space between the jaws J and J' of the vise and forming block respectively, for clamping the work W between said jaws.

It will be understood by reference to Fig. 1 that the inner edges of the jaws J and J' are at all times parallel and longitudinally disposed on a line cutting the axis of the base, preparatory to a bending operation, and when the vise is moved for effecting the complete right angle bend, the inner edges of said jaws will be alined transversely of the base on a line cutting the axis thereof.

A guideway 32 is formed on the rectangular portion of the base B, with guides 33, 33, at the sides thereof for slidably receiving a forming block F' which is mounted on the upper surface of the base in a plane slightly below the level of the block F on the vise. It will be noted that the blocks F and F' have longitudinal recesses 32', 32', cut in the sides thereof and corresponding to the guideways 17 and 32 of the vise and base respectively, in which said blocks are adapted to slide.

The forming block F' has a jaw J1 on the inner end thereof and a gripping surface 34 which is adapted to be alined with the surface 18 of the block F, as shown in Fig. 1, and the inner edge of jaws J' and J1 of blocks F and F' are adapted to be substantially in abutting position, the jaw J1 of block F' being braced against the base 35 of said block by means of a rib 36.

Block F' has depending lugs 37, 37, thereon which correspond to the lugs 21, 21, of block F, and said lugs 37 are bored at 38 to receive a screw S' corresponding in character to the screw S of the vise. The outer end of screw S' is reduced at 39 and is journaled in the rib 40 of the base, while the portion 41 at the rib of said screw is journaled in the transverse rib 42 of said base.

The screw S' also has an extension 43 which extends rearwardly through an opening 44 in the web 1 of the base, and is journaled in a boss 45 formed on said base, and is provided at its rear end with a handle h' pivoted thereto and corresponding to the handle h on screw S. A nut N' substantially similar to the nut N of the vise, is threaded to receive the screw S' and is held between the lugs 37, 37 of the forming block F', so that when the screw S' is turned the forming block F' will be moved longitudinally on the base to an extent corresponding to the movement of the block F on the vise. The nut N' has the lateral portions 29', 29' which engage guideways 46, 46 formed on the body of the base, as shown in Fig. 4, and serve to guide the nut in its movement thereover.

The ends 23 and 39 of the screws S and S' are provided with cotter pins 47, 47, for preventing the withdrawal of the screws from their bearings.

Now, in operation the vise V is positioned with respect to the forming block F', and the base B, as shown in Fig. 1. The blocks F and F' are adjusted by means of the screws S and S' respectively, so as to be alined transversely of the base and in spaced relation to the jaw J of the vise, the work W which is to be bent is then placed in position by the jaws J and J' of the vise and against the jaw J1 of the block F', whereupon the screws S and S' are turned for tightly gripping the work between the adjacent surface of the jaws. Thereafter the vise V may be swung in a clock-wise direction on the base and over the rib 2 thereof by means of the handle H, to any extent up to and including a right angle for the form of device shown in the drawings. In such case the portion of the work W which is gripped between the jaws J and J' will be bent at an angle relative to the portion which abuts the jaw J1, thereafter the screws S and S' may be turned for loosening and removing the work W from the vise.

It will be understood in this connection that the jaws of the forming blocks may be so formed and the machine so devised as to permit the turning of the vise on the base so as to make bends of greater extent than 90 degrees, but in the drawings I have shown a device arranged only for making bends up to and including 90 degrees.

When the work is removed from the vise, the vise may be restored to normal position and other strips or pieces of metal inserted successively for other operations, and said operations are performed in a like manner.

In the event that the machine is to be used for ordinary purposes of a vise, the screw S' may be operated for removing the block F', so as to clear the work, and the work may be gripped between the jaws J and J' of the vise proper. In such case, a bolt or pin may be inserted through the holes 14 and 14' of the vise and base respectively, for holding the vise immovable on the base while the vise is being so used.

It will be observed that the vise may be turned to an acute angle on the base so as to be more convenient and accessible for the reception of certain kinds of work, and to better clear the forming block F'.

What I claim is:

1. A machine of the character described including a base, a swivel vise mounted thereon having a stationary jaw and a longitudinally movable jaw having parallel gripping surfaces, the gripping surface of said stationary jaw being in a plane cutting the axis of said swivel vise, a forming block adjustable longitudinally on said base and having a jaw adapted to be alined with the movable jaw of said vise, preparatory to a bending operation, whereby when the work is gripped between the jaws of said vise and said vise is turned on the base, said work will be bent against the jaw of said forming block.

2. A machine of the character described including a base, a swivel vise mounted thereon and including a stationary jaw and a longitudinally adjustable jaw having parallel gripping surfaces, a forming block adjustable longitudinally on said base and having a fixed jaw adapted to be alined with the adjustable jaw of said vise, preparatory to a bending operation, whereby when the work is gripped between the jaws of said vise and said vise is turned, said work will be bent against the fixed jaw of said forming block, the corresponding ends of the jaws on said vise being on a line cutting the axis thereof, and the intersection of the gripping surface and the end of the stationary jaw on said vise being at the axis thereof, for the purpose described.

3. A machine of the character described including a base, a swivel vise mounted thereon and including a stationary jaw and a longitudinally adjustable jaw having parallel gripping surfaces, a forming block adjustable longitudinally on said base and having a fixed jaw adapted to be alined with the adjustable jaw of said vise, preparatory to a bending operation, whereby when the work is gripped between the jaws of said

vise and said vise is turned, said work will be bent against the fixed jaw of said forming block, and screw means for adjusting the adjustable jaw of said vise and said forming block.

4. A machine of the character described including a base, a swivel vise mounted thereon and including a stationary jaw and a screw-operated jaw having parallel gripping surfaces, a forming block adjustable longitudinally on said base and having a fixed jaw adapted to be alined with the screw operated jaw of said vise, preparatory to a bending operation, whereby when the work is gripped between the jaws of said vise and said vise is turned, said work will be bent against the fixed jaw of said forming block, the corresponding ends of the jaws on said vise being on a line cutting the axis thereof, and the intersection of the gripping surface and the end of the stationary jaw on said vise being at the axis thereof, and screw means for adjusting said forming block.

5. In a machine of the character described comprising a base, a vise having a frame pivoted to and substantially in the center of said base, a stationary jaw on said vise having one corner thereof alined with the axis of said frame, a forming block longitudinally adjustable on said vise frame and having a jaw thereon cooperating with the stationary jaw on said vise, means for supporting said vise on said base so that the adjustment of said forming block will be longitudinal of said base, preparatory to a bending operation, a forming block adjustable longitudinally on said base and having a jaw adjustable with the jaw on the forming block on said vise, relative to said stationary jaw, screw means for operating said forming blocks for gripping the work between said jaws, to be bent therein, whereby when said vise is turned on said base the work will be bent against the jaw of the forming block on said base.

6. In a machine of the character described a base, a vise pivoted on said base and having an adjustable and a stationary gripping jaw, a forming block longitudinally adjustable on said base and having a jaw adapted for adjustment corresponding to that of the adjustable vise jaw, and to be held stationary during a bending operation, screw means for operating said jaws for gripping the work to be bent, the portion of the work held between the jaws of said vise being bent by the movement of said vise, and the other portion of the work being held stationary against the jaw of the forming block on said base.

7. A machine of the character described embodying a base having a circular rib on the upper side thereof, a vise pivotally mounted substantially in the center of said base and having a portion overlying said

rib, a stationary jaw on said vise positioned so that the intersection of two of the sides thereof will be alined with the axis of the vise, a movable jaw on said vise, screw operated means for longitudinally advancing and retracting said movable jaw relative to said stationary jaw, a forming block adjustable longitudinally of said base and having a jaw adapted to be alined transversely with the movable jaw of said vise, preparatory to a bending operation, and to be held stationary during a bending operation, screw operated means for advancing and retracting said forming block, and means for locking said vise in selected positions on said base, for the purpose described.

8. A machine of the character described including a base having guideways thereon, a forming block slidably mounted in said guideways and having a jaw with a work engaging surface disposed transversely of said base, screw operated means for adjusting said forming block longitudinally of said base, a vise frame pivotally mounted on and substantially in the center of said base, and having guideways thereon, a forming block slidably mounted on said frame and in said guideways, and adapted to be adjusted longitudinally of said frame, the forming block on said vise having a rigid jaw thereon with a gripping surface normally disposed transversely of said base, and on a longitudinal line cutting the axis of said frame, screw operated means for adjusting the forming block on said vise on said frame and for clamping the work between said vise jaws, whereby when said vise is turned on said base a portion of the work will be held against the jaw on the forming block on said base, and the work bent to an angle corresponding to the extent of movement of said vise.

9. A machine of the character described comprising a base having a pair of horizontally adjustable forming blocks thereon, with parallel work engaging surfaces disposed transversely of the base, means for separately adjusting said forming blocks, a frame pivoted to said base and having a stationary jaw with a gripping surface paralleling the gripping surfaces of said forming blocks, one of said forming blocks being movable with said frame, and the other forming block being stationary during a bending operation.

10. A machine of the character described comprising a base having a pair of forming blocks adjustable in planes paralleling the top surface of said base and having jaws with work engaging surfaces disposed transversely of the base, means for separately adjusting said forming blocks, a frame pivoted to said base and having a stationary jaw having a gripping surface paralleling the gripping surface of said forming block jaws,

one of said forming blocks being movable with said frame, and the other forming block being stationary during a bending operation, and manually operable screws for

adjusting said forming blocks.

11. A machine of the character described comprising a base having a pair of forming blocks adjustably held thereon and having jaws with work engaging surfaces disposed transversely of the base, means for separately adjusting said forming blocks, a frame pivoted to said base and having a stationary jaw with a gripping surface paralleling the gripping surfaces of said forming block jaws, one of said forming blocks being movable with said frame, and the other forming block being stationary during a bending operation, guideways on said base and on said frame, manually operable screws for adjusting said forming blocks, one of said forming blocks being movable in the guideways on said base, and the other forming block being movable in the guideways on said frame.

12. A machine of the character described comprising a base having a pair of forming blocks adjustably held thereon and having jaws with work engaging surfaces disposed transversely of the base, means for separately adjusting said forming blocks, a frame pivoted to said base and having a stationary jaw with a gripping surface paralleling the gripping surface of said forming block jaw, one of said forming blocks being movable with said frame, and the other forming block being stationary during a bending operation, guideways on said base and on said frame, a manually operable screw for adjusting each of said forming blocks, one of said forming blocks being movable in the guideways on said base, and the other forming block being movable in the guideways on said frame, a pair of spaced depending lugs on each of said forming blocks embracing said screws, respectively, and a threaded block carried on each of said screws between said lugs for effecting the movement of said forming blocks when said screws are rotated.

13. A machine of the character described comprising a base, a vise frame pivoted to said base and having one side disposed in a plane cutting its axis, a manually operable screw journaled in said frame and normally positioned longitudinally of said base, a

forming block on said base adjacent said vise frame, a manually operable screw for adjusting said forming block longitudinally on said vise frame, said vise frame having a stationary jaw and a movable jaw, and said forming blocks having adjustable jaws, all of said jaws having gripping surfaces normally disposed transversely of said base, the inner edges of said vise jaws being on a longitudinal line cutting the axis of said frame, and the gripping surface of said stationary vise jaw being also on a relatively right-angular line cutting the axis of said frame.

14. A machine of the character described comprising a base, a vise frame pivoted to said base and having a stationary jaw with one gripping surface and one edge disposed in right angular planes cutting the axis of said frame, a movable jaw on said vise frame also having one end thereof disposed on a line cutting the axis of said frame, a forming block on said base having a jaw with a work engaging surface paralleling the gripping surface of said other jaws and adjustable relative thereto, a circular rib on said base concentric with the axis of said frame, and an extension on said frame overlying said rib, for the purpose described.

15. A machine of the character described comprising a base, a forming block pivotally and reciprocally mounted on said base, a supporting frame therefor having a stationary jaw, said forming block having a jaw integrally formed thereon for cooperation with the jaw on said frame, a forming block reciprocally adjustable on said base and cooperating with said other forming block, guideways on said frame and on said base for said forming blocks, respectively, manually operable screws for operating said forming blocks, said frame and said base having central openings therein, a pair of spaced lugs depending from the respective forming blocks into said openings, for the reception of said screws, and a threaded block carried on each of said screws between said lugs and having portions engaging portions of said frame and said base, respectively.

CLARENCE S. GORDON.

Witnesses:

IRENE BREEN,  
CHAS. BAGG.